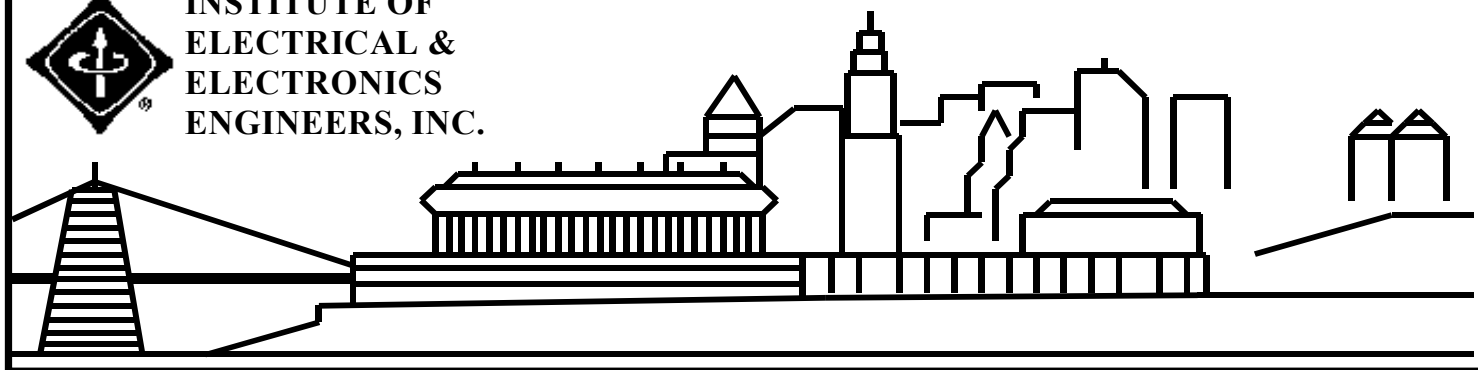




INSTITUTE OF
ELECTRICAL &
ELECTRONICS
ENGINEERS, INC.



OCTOBER 1996

IEEE CINCINNATI SECTION NEWSLETTER

OCTOBER MEETING PERSONAL COMMUNICATIONS SYSTEMS

DATE: THURSDAY, OCTOBER 24, 1996

PLACE : Institute of Advanced Manufacturing
Sciences (IAMS)
(see map on Page 8 for directions)

TIME: 5:30 p.m. (Social Time)
6:00 p.m. (Dinner)
7:00 p.m. (Program)
8:30 p.m. (Approx. - Adjourn)

COST: \$7.00 (Members)
\$3.00 (Students)
\$9.00 (Non-Members)

Reservations are required for dinner only!!!!

Please call Dee Scott at

385-9446

by **Noon, Wednesday, October 23rd** if you plan to attend.

ABOUT THE MEETING: This month's meeting will feature a presentation by Mr. T. R. Stoner of Cincinnati Bell Telephone on Digital PCS Technology

There are many new digital technologies competing for acceptance in the race to turn-up broadband Personal Communications Service (1.9 GHz cellular).

This presentation reviews each technology and compares them with traditional analog cellular service. Traditional cellular is also incorporating the same new technologies, blurring the distinction between Cellular and PCS offerings.

PCS technology is currently being used for mobile telephone users. It is being touted as a an alternative to wireline telephony for various applications. Numerous companies in the United States have been planning the deployment of their own PCS networks. As the FCC completes its auction of the available PCS

frequencies, and the players in each marketplace are determined, PCS will become a reality. The presentation will focus on Personal Communications Systems.

ABOUT THE SPEAKER: T.R. Stoner, PE received B.E.E. and M.S.E.E. degrees from the University of Dayton and Purdue University in 1987 and 1988 respectively. From 1988 to 1994 he was a System Engineer with CTI Mobilcomm working on the design and deployment of Land Mobile Radio systems for Police, Fire, and Industry use. From 1994-1996 he was Lead System Engineer with Motorola working on the deployment and optimization of next generation digital land mobile and digital cellular radio networks. He is currently with Cincinnati Bell Telephone working in the areas of long range network planning for wired and wireless telecommunication networks. His interests include broadband network architectures and wide area coverage radio networks. T.R. is an active amateur radio operator, holding the call WR4T, and enjoys restoring older tube type radio equipment.

CHAIRMAN'S MESSAGE

by Steve Olenick

When I moved into the area several years ago, one of the first things my wife did was taste the water and remark "The water is good!"

Now I know why. We toured the Cincinnati Water Works last night and discovered that Cincinnati has the only Granular Activated Carbon Adsorption and On-site Reactivation System in the country. This facility provides an exceptionally pure drinking water that greatly exceeds federal requirements. We also learned how the water is pulled from the Ohio river and it is pumped through a series of operations to remove the impurities and sediment.

We were hosted by Mr. Jack Demarco, Cliff Shrive, Paul Kraus and Bill Reeves. Many thanks to them for their fascinating and informative tour.

If you have any suggestions for technical meetings please contact me at 513-573-6555 or e-mail me at SOLENICK@CINELE.COM. Until next time.

A MESSAGE FROM YOUR PACE CHAIRMAN

By Bill Lohner

"A Network of Professional Activities for Engineers"

In last month's column we were looking to get more recognition for individuals in the Cincinnati Section for their accomplishments. Again, our goal is to get an award for an IEEE member at the annual Engineers and Scientists of Cincinnati meeting in February. As of this date we have one candidate for one of the awards. We really would like to increase the probability of an IEEE member getting an award, so please send in or call suggesting someone you think worthy of one of these awards. They are as I mentioned last month as follows:

Distinguished Engineer of Cincinnati
Distinguished Scientist of Cincinnati
Young Engineer
Young Scientist
Professional Accomplishment
Community Service

I still do not have information on the qualifications for a national award. Perhaps we can have them for the November Newsletter.

In another area the Cincinnati Section intends to encourage high school students to choose curriculum which will lead to college degrees in the technical area. The IEEE will distribute pamphlets to local high schools aimed at sophomores and juniors to take subjects to gain college admission. Things discussed in the pamphlets are "Where Will You Be In 10 Years?", Engineers Turn Ideas Into Reality, What Do Engineers Do?, After High School - What?", etc.

I would like to hear from anyone with constructive ideas and suggestions.

William J. Lohner
PACE Chairman
8703 Indianwoods Drive
Cincinnati, Ohio, 45251
(513) 385-7268

**DEVELOPMENT OF THE
INTEGRATED CIRCUIT (IC)**
by R. J. Reiman, Historian

Robert Noyce, son of a Congregationalist minister, as a physics major at Grinnell College, Iowa, was introduced to solid-state physics by the school's physics professor, Grant Gale, who was also a friend of John Bardeen of Bell Labs, one of the inventors of the transistor. Gale asked Bardeen to send him a sample of the transistor in 1948. Noyce experimented with it at Grinnell and he decided to specialize in solid-state physics at graduate school.

He went to MIT, but found no courses in solid-state physics and the transistor was unknown to them. Noyce and Gale continued to compare notes, and when Noyce received his Ph.D., he met up with Swiss-born physics Jean Hoerni when both arrived in Mountain View, California to work for Shockley Semiconductor Laboratory, a small company owned by William Shockley, the transistor's co-inventor. Noyce, Hoerni, and 6 other scientists and engineers left the Lab to found Fairchild Semiconductors and to develop advances in silicon transistors. The state of the art was the SILICON MESA TRANSISTOR which had been invented by Bell Labs and had been used by Jack Kilby in his IC's at Texas Instruments. Hoerni came up with a solution to the problem of the MESA, which was susceptible to contamination, and whose connection wires tended to slip. Hoerni diffused the MESA into a wafer, i.e., chemically-embedded the transistor into a piece of silicon. The result was a completely flat transistor, which he coated with a thin layer of silicon dioxide which insulated and protected the transistor. Spots were left for contact points. The technique was called the PLANOR PROCESS.

Sprague Electric Company's Kurt Lehovec, a Czech-born physicist, had been working on a better way to make ALLOY JUNCTION TRANSISTORS, which Shockley had also invented. He successfully devised and improved manufacturing process. He then took the next step: isolating components electrically in an integrated circuit. His solution was similar to one that Jack Kilby used, i.e., employ a PN JUNCTION as a diode so that electricity could only flow in one direction. This was also successful.

Noyce was also thinking about making IC's in January 1959, and he succeeded in developing an IC combining Hoerni's PLANOR PROCESS and Lehovec's PN JUNCTION technique. Noyce's resulting device made manufacturing practical. For a resistor, he used a diode-isolated piece of silicon, and he built logic circuits by evaporating metal on top of the insulating layer through a mask. Horizontal connecting wires were an

improvement over vertical ones.

Commercial development of the IC followed with all participating companies freely licensing their patents. In 1961, Fairchild and TI introduced the first chips that performed Boolean logic such as OR and NOR. In the mid-1960's, prices of the chips became reasonable, and NASA selected the IC's for the GEMINI capsule on-board computer.

Both difficult and expensive was the redesign of large computers both from tubes to transistors, and transistors to IC's.

The next step: why not put a central processor on a chip and call it a MICROPROCESSOR? To follow would be the personal computer.

A MESSAGE FROM THE EDITOR

by Bob Morrison

In order to save duplication, handling and mailing costs, we will now offer distribution of this Newsletter via e-mail. If you would like to receive this Newsletter by e-mail instead of through the normal mailing route, please send an e-mail message to me at <j.r.morrison@ieee.org>. You must include in your e-mail your complete mailing address to which the newsletter is currently mailed. In addition, the e-mail edition of the newsletter can be sent either in a Microsoft Word 7.0 format or plain text. Please indicate the format you desire. Thank you.

NEW CINCINNATI SECTION IEEE MEMBERS

The following are new IEEE Members in the Cincinnati Section:

MARC A. BELL
SCOTT M. BLANDFORD
AMY C. BUSH
JASON F. CANTIN
WILLIAM G. KAUP
D. WYATT MCMILLION
YOUNG-OH ROH

The following are existing IEEE Members who have moved into the Cincinnati Section:

NEIL D. AMES
JAMES D. BRIDGES
ROB COOPER
ROD J. COPE
BRITT A. DAVIS
STANLEY E. GREATLINE
PATRICK T. HOMER
ERIC M. JOHN
STEVEN D. JOHNSON
ROBERT E. PATRICK III
JAMES J. PICKERING
GORDON T. SAMUELS
KENNETH J. SEMEGA
THEODORE R. STONER

DALE F. VASLOW

Welcome to our Section!!!!

EET&MET@NKU.ABET

TAC/ABET recently announced that both the Electronics Engineering Technology and Manufacturing Engineering Technology programs at Northern Kentucky University have been accredited. These bachelor's degree programs were started in 1988 and are arranged for both day and night students. Recipients of associate degrees from either the University of Cincinnati or Cincinnati State and Technical College who are Ohio residents can take advantage of a reciprocity agreement that permits them to attend NKU for Kentucky in-state tuition. Please contact Randy Holt at NKU for further details. Work telephone number is (606) 572-5710, FAX is (606) 572-5398, and e-mail can be sent to holtr@nku.edu.

IEEE NEWS

PISCATAWAY, NJ, September 9, 1996 -- Health

care reform was one of the greatest promises and most conspicuous failures of the Clinton Administration. But the revolution in health care is taking place anyway, with the rise of the managed-care movement and aggressive cost-cutting by health care providers. These changes will bring new ethical and social challenges.

These issues are explored by 10 distinguished authors in a special issue of IEEE Technology and Society magazine:

#1. Abandonment of the Patient -- Claire Fagin, former dean of nursing and past president of the University of Pennsylvania, protests against the decline in quality of patient care resulting from the "corporatization" of the health care system.

#2. Medical Technology Development -- Limiting Regulation -- Susan Bartlett Foote, author of the book "Managing the Medical Arms Race," describes the "policy arms race" and its impact on the development of new medical technology. Foote says the 1994 claims that the U.S. government was being fraudulently billed for procedures involving investigational devices threatened to have serious impact on the development of new medical devices.

#3. The Truth About Technology and Health Care Costs -- "Even when a new medical technology increases health care costs, it does not necessarily mean the medical technology is not cost effective," say Candace Littell and Robin J. Strongin. Littell is president, C. L. Littell & Associates, Inc., formerly executive director, Health Care Technology Institute and Strongin is senior associate, Lash Group Health Care Consultants, formerly acting executive director and director of Research Programs, Health Care Technology Institute. They call for including indirect benefits to the consumer and society when assessing the costs of medical technology.

#4. Are Technology and Ethics Out of Step? Oregon's Experience -- Paige R. Sipes-Metzler, executive director of the Oregon Health Services Commission, reviews Oregon's efforts to develop sustainable financing of health care by redefining the benefits package it provides to its citizens. This practice has created ethical and legal conflicts over the reimbursement for some medical treatments. The author predicts that a consideration of costs and effectiveness of treatment will have a greater role in the future on public medical benefits programs.

#5. Emerging Medical Technologies: Balancing Risks and Benefits -- Economist David C. Murray, Hudson Institute, argues that the number of lives lost by failure to adopt new medical technologies already available in

other countries has led to the loss of more American lives than were likely to have been saved by the present regulatory policies.

#6. Ethical Issues in Managed Care -- John Fielder, Department of Philosophy, Villanova University, examines new privacy issues and changes in the doctor-patient relationship resulting from attempts by management of health care organizations to limit medical costs. These include restrictions that restrain physicians from discussing a full range of treatment options and misusing peer reviews to punish doctors who do not comply with managed care firms' cost-cutting policies.

#7. Information and Medical Ethics: Protecting Patient Privacy -- Reid Cushman, Yale University, examines the increasing potential for misusing patient information and failing to protect the confidentiality of patient records. He cautions against the widespread sale of patient information for marketing purposes.

#8. Technology and Health Care: Driving Costs Up, Not Down -- Joel L. Nitzkin, Louisiana State University Medical Center, points out that "the health care delivery system has a disastrous record of promising cost savings from new technical advances, then delivering cost increases with little evidence of health improvement." He argues that new technologies, such as telemedicine, will not automatically reduce health care costs. He predicts the impact of managed care will be far greater than the impact of technical innovation because managed care incentives and regulations will largely determine the purposes for which the technical advances will be used.

Medicine's Dark New Age -- This editorial, from Joel Nobel, president of ECRI, a major organization for evaluating medical devices, argues that "excess overhead in the health care system... is largely the product of federal policies and incentives." Nobel says federal policies were responsible for generating demand for new medical technologies. "Now, nobody wants to pay the bill," he says.

Expanding the Hippocratic Oath -- A perspective from University of Tucuman's Max Valentinuzzi, a prominent biomedical engineer in Argentina, points out that arguments about health care costs and new medical technologies overlook the fact that many people fail to receive even the most basic medical services.

IEEE HOTLINES AUGUST, 1996

IEEE-USA JOB LISTING SERVICE MARKS SECOND ANNIVERSARY WITH INVITATION TO HIGH-TECH CEOs

IEEE-USA ushered in the third year of its popular National Job Listing Service by issuing a challenge and invitation to 1,600 CEOs of high-technology firms. In a July 31 letter to the chief executives, IEEE-USA Chair Joel B. Snyder extolled IEEE-USA's Internet-based employment service as the ideal vehicle for companies experiencing difficulty finding qualified technical talent in today's tighter engineering labor market.

The National Job Listing Service -- which offers job-seekers Web, Gopher and e-mail versions of regional listings of job openings -- has experienced explosive growth in its first two years of existence. During the first half of 1996, nearly 75,000 visitors logged onto the free member service, which has posted several thousand job openings since it began.

Meanwhile, as widely reported during the recent employment-based immigration debate, some companies have complained publicly that they have been unable to find enough qualified electrotechnologists in the United States. A few large high-tech corporations even claimed they had 1,000 or more unfilled technical positions.

In his letter, Snyder challenged CEOs to make use of IEEE-USA's Job Listing Service as "an inexpensive, effective way to advertise your openings to the Institute's members." He added: "We don't know a better way to uncover engineering talent than to list openings with an organization that has the largest membership of electrotechnology professionals in the United States. We are committed to be THE electronic location for electrical, electronics and computer professionals to begin their job searches."

Snyder's claims for the National Job Listing Service were supported recently by a national recruiters' newsletter. According to the July 30 ELECTRONIC

RECRUITING NEWS: "If you're trying to recruit technical professionals, we suggest going straight to the source. The IEEE has one of the most heavily trafficked employment Websites on the 'net.'"

The Web URL for the IEEE-USA National Job Listing Service is www.ieee.org/jobs.html. For more information on the service, or to post job openings, contact IEEE-USA's Bill Anderson at 202-785-0017, ext. 330, or w.anderson@ieee.org.

IEEE-USA TESTIFIES ON EMPLOYMENT SECURITY

IEEE-USA activist Richard J. Backe, in testimony prepared for the July 18 Capitol Hill Forum on Employment Security, called for a long-term national technology policy to ensure the proper supply, training and utilization of the nation's engineering work force.

Recounting the cyclical nature of engineering layoffs during the 20th century, Backe stated that any plan to shore up employment security for engineers must contain stability, foresight and a sharply focused mission. He cited as a model a post-World War II proposal by presidential science adviser Vannevar Bush. This proposal would have established technology data and impact centers "that could dispassionately and expertly collect data about proposed science and technology, and about the implementing resources -- including manpower," he said. Backe added that such centers could "help guide our nation to a rational, long-term and continuing science and technology policy."

Backe also noted the need to "develop a national technology consensus for the 21st century" that could capture the imagination and energies of American society. He suggested that a return to manned space exploration could provide such a focus.

For a copy of Backe's testimony, contact IEEE-USA's Vin O'Neill at 202-785-0017, ext. 319, or v.oneill@ieee.org.

SENS. SIMPSON, KENNEDY AMONG IEEE-USA AWARD-WINNERS

IEEE-USA will present its 1994 distinguished public service award jointly to Sen. Alan K. Simpson, R-Wyo., and Sen. Edward M. Kennedy, D-Mass. Simpson and Kennedy will be honored for their successful efforts to enact improvements in Medicare, Medicaid and the portability of private health insurance, as well as their attempt to legislate reforms of the employment-based immigration system that would have provided better safeguards for the employment, wages and working conditions of engineers employed in the United States.

IEEE-USA will recognize the two senators during an annual awards ceremony at its Professional Activities Committees for Engineers (PACE) Conference and Workshop Aug. 30-Sept. 2 in Phoenix. In addition, another 21 individuals will be honored for achievements that have advanced the objectives of IEEE-USA's professional activities.

James V. Leonard, of St. Charles, Mo., will receive the award for distinguished contributions to engineering professionalism. Leonard was selected for his "tireless advocacy of the professional interests of IEEE members and for extensive contributions of time and energy toward furthering the professional aims of the IEEE and the profession," according to IEEE-USA's citation. Leonard has served in numerous leadership roles on the local and national level, including as IEEE-USA vice chair in 1993-94 and chair of its Engineering Employment Benefits and Student Professional Awareness Committees.

IEEE-USA will present the Harry Diamond Memorial Award to IEEE Fellow George G. Harman, a Fellow of the National Institute of Standards and Technology (NIST), for achievements in electrotechnology while in U.S. government service. Harman, of Chevy Chase, Md., will be honored for his authoritative contributions to understanding the science and metallurgy of contact bonding and the implementation of this knowledge in device and packaging interconnections.

IEEE-USA's electrotechnology transfer awards will be presented to IEEE Fellows Allen C. Newell of Boulder, Colo., and B. Don Russell of College Station, Texas. Newell, chief of NIST's Electromagnetic Fields Division of its Electronics and Electrical Engineering Laboratory, will be honored for his leadership role in the development and implementation of antenna near-field scanning methods, which have become the preferred measuring tools for evaluation and testing of advanced antennas. Russell, director of Texas A&M's Energy Systems Laboratory, will be recognized for his research and development in the application of microcomputers and signal processing to electric power distribution protection and automation.

Two individuals will receive awards for literary contributions in the technology field. IEEE Life Fellow Irving J. Gabelman, of Rome, N.Y., will be recognized for contributions furthering engineering professionalism. The editor of THE NEW ENGINEER'S GUIDE TO CAREER GROWTH AND PROFESSIONAL AWARENESS, Gabelman will be cited for concisely summarizing the many topics all engineers must master to manage their own careers. Jon Palfreman of Boston's WGBH Television will receive the award for contributions furthering public understanding of the profession. Palfreman produced, wrote and directed "Currents of Fear," a PBS documentary described as an insightful and balanced view of the controversy over potential health effects of electromagnetic fields from electric-power distribution systems.

IEEE-USA will present several long-time volunteers with citations of honor and professional achievement awards. Receiving citations of honor: Deborah M. Powers of Norcross, Ga., for elevating engineering professionalism to a full-time, focused activity in Region 3; her husband Vernon Powers, for originating several employment-assistance projects; Thomas F. Rogers of McLean, Va., for his leadership in developing IEEE-USA space policy; and Irwin Weitman of East Northport, N.Y., for his work in spearheading the establishment of the Alliance of IEEE Consultants' Networks. In addition, Joyce I. Medalen of Grand Forks, N.D., will receive a special Chair's Citation for her work in introducing young women to the rewards of engineering careers.

Earning professional achievement awards: Harvey Altstadter of Coram, N.Y.; William L. Aseniero of Wichita, Kan.; Henry A. Burger, P.E., of Tempe, Ariz.; Thomas W. Doepfner of Alexandria, Va.; Robert L. Krause of Fort Worth, Texas; Gary E. Johnson of Houston; Joseph V. Lillie of Lafayette, La.; Jorge Medina of Longwood, Fla.; Gordon L. Mitchell of Woodinville, Wash.; David J. Pierce of Sunset, La.; and Ned R. Sauthoff of Princeton, N.J.

IEEE-USA SPONSORS NATIONAL CONSULTING CONFERENCE

IEEE-USA's Alliance of IEEE Consultants' Networks (AICN) will hold its Sixth National Conference and Workshop on Consulting October 4 - 6 at the Sheraton National Hotel in Arlington, Va.

The event is designed for AICN members and other engineers who have practiced consulting, are just starting out, or who are considering getting into the consulting business. Conference sessions will cover such topics as marketing, government contracting, international consulting, running a business, fee setting, contracts, left/right brain consulting, effective writing, and balancing business and personal life.

According to conference organizer Peter Soltesz: "From the innovative Friday evening opening session to the closing session on Sunday, you'll hear fresh ideas and proven techniques from experienced consultants. You'll also find an ideal informal atmosphere in which to compare notes with others -- to find out what works and what doesn't from people who know."

Conference registration is \$125 for AICN members and \$150 for other IEEE members. For more information or to register, contact Peter Soltesz at 301-924-2610 or psoltesz@ieee.org.

IEEE-USA TO SPONSOR NATIONAL ENGINEERS WEEK 1997

Through its U.S. Activities division, IEEE is sponsoring National Engineers Week 1997 which is scheduled for February 16-22, 1997.

National Engineers Week's mission is to increase awareness and appreciation of the profession. In 1996, more than 35,000 engineers participated in activities reaching millions of Americans.

In addition to hundreds of local events, several nationally-organized programs will offer engineers opportunities for involvement, including Discover"E," Engineering Goes Public and the National Engineers Week Future City Competition. For Discover"E," volunteers visit classrooms to teach youngsters practical applications of math, science and technology through hands-on activities. Engineering Goes Public sponsors technology fairs that educate the public at more than 600 libraries, science centers, engineering project sites and shopping malls. The Future City Competition, in which engineers help student teams design urban centers of the 21st Century, will hold regional contests in Baton Rouge, Buffalo, Chicago, Denver, Detroit, Los Angeles, Milwaukee, New York City, Philadelphia and Washington.

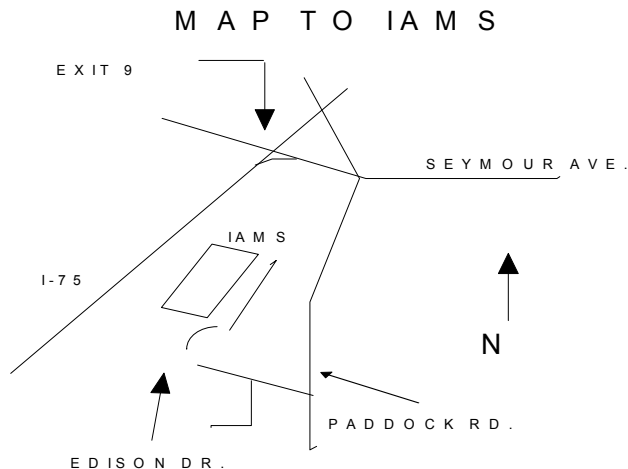
In sponsoring the 1997 event, the Institute joins 17 other societies, led this year by the National Society of Black Engineers, and 11 major corporations, including 1997 lead corporate sponsor Motorola. National Engineers Week has been an annual celebration since 1951.

W.I.S.E. INTERNS SOUGHT BY IEEE-USA

IEEE-USA is looking for two outstanding engineering juniors with strong leadership skills and a keen interest in public policy to participate in the 1997 Washington Internships for Students of Engineering (W.I.S.E.). Listed by The Princeton Review as one of "America's Top 100 Internships," W.I.S.E. allows up to 16 engineering or computer-science students selected by various engineering societies to spend the summer in Washington, D.C., learning first-hand how engineers can contribute to public-policy decisions on complex technology issues.

Throughout the 10-week program (June 2-Aug. 8, 1997), students interact with decision-makers in Congress, the Administration, industry and prominent non-governmental organizations. In addition, each student researches and presents a paper on a topical technology-policy issue. Students work with their sponsoring society and under the guidance of a faculty advisor. In addition to a stipend of \$1,400, lodging in a dormitory on the campus of George Washington University, and travel expenses are provided.

Applications for 1997 Summer Internships must be received by Dec. 13, 1996. For application forms, contact W.I.S.E., Attn: Anne Hickox, 400 Commonwealth Drive, Warrendale, PA 15096-0001; phone: 412-776-4841, ext. 7476; fax: 412-776-2103; e-mail: anne@sae.org. For more information, check out the W.I.S.E. homepage at <http://www.ieee.org/WISE> or contact IEEE-USA's Chris Brantley at 202-785-0017, ext. 303, or c.brantley@ieee.org.



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OCTOBER 1996

IEEE CINCINNATI SECTION NEWSLETTER



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Electronics Engineers, Inc.**

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DATED MATERIAL
Please deliver promptly